New Status and Combinations for Japanese Taxa of *Chionographis* (Melanthiaceae)

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ABSTRACT. *Chionographis japonica* var. *hisauchiana* Okuyama is raised to specific rank as *C. hisauchiana* (Okuyama) N. Tanaka, since it differs markedly from *C. japonica* (Willdenow) Maximowicz var. *japonica* in several characters. *Chionographis japonica* var. *minoensis* H. Hara and *C. japonica* var. *kurohimensis* Ajima & Satomi are transferred to *C. hisauchiana* at subspecific rank as *C. hisauchiana* subsp. *minoensis* (H. Hara) N. Tanaka and *C. hisauchiana* subsp. *kurohimensis* (Ajima & Satomi) N. Tanaka, respectively. A key to the four taxa accepted here is presented.

Key words: *Chionographis*, Japan, Melanthiaceae.

The genus *Chionographis* Maximowicz is often placed in the tribe Heloniadeae, together with *Chamaelirium* Willdenow of eastern North America and a few other genera (Engler, 1888, tribe as Helonieae; Hutchinson, 1934; Tamura, 1998), under Melanthiaceae (Maximowicz, 1867, as Melanthaceae; Tamura, 1998) or Liliaceae (Engler, 1888; Hutchinson, 1934). It is apparently most closely allied to *Chamaelirium*, from which it differs mainly by its zygomorphic flowers (vs. actinomorphic), unequal tepals (vs. equal), fewer ovules (2 vs. 6–12 ovules per locule), polycentric chromosomes (vs. monocentric), and in the sexual attributes (plants usually hermaphrodite or gynodioecious vs. dioecious) (Tanaka & Tanaka, 1977, 1979; Tanaka, 1985).

Chionographis is distributed in Japan, Korea, and southern China (Hara, 1968; Chen, 1980; Tanaka, 1985; Chen & Tamura, 2000). According to Hara (1968), it comprises four species, of which two, *C. japonica* (Figs. 1A, 2A) and *C. koidzumiana* Ohwi, are distributed in Japan (the former also in southern Korea). Only the former species, as traditionally circumscribed, is considered here. Hara (1968) recognized three subspecies under *C. japonica*, i.e., subspecies *japonica*, subspecies *hisauchiana* (Okuyama) H. Hara (Figs. 1B, 2B, under the name *C. hisauchiana* subsp. *hisauchiana*), and subspecies *minoensis* (H. Hara) H. Hara (Fig. 2C, under the name *C. hisauchiana* subsp. *minoensis*). Later, a new variety, *C. japonica* var. *kurohimensis* Ajima & Satomi (Fig. 2D, under the name *C. hisauchiana* subsp. *kurohimensis*), was described by Ajima (1976).

Hara's *Chionographis japonica* subsp. *hisauchiana* (Figs. 1B, 2B) differs markedly from *C. japonica* subsp. *japonica* (Figs. 1A, 2A) in several characters such as floral, vegetative, chromosomal, sexual, and breeding attributes (Tanaka, 1985, and key below). It seems, therefore, more appropriate to treat it at specific rank. Hara's *C. japonica* subsp. *minoensis* (Fig. 2C) and Ajima and Satomi's *C. japonica* var. *kurohimensis* (Fig. 2D) are, respectively, much closer in morphological, chromosomal, sexual, and breeding characters to *C. hisauchiana* than to *C. japonica* (Tanaka, 1985, and key below). *Chionographis japonica* subsp. *minoensis* differs from *C. hisauchiana* mainly in leaf characters and has a disjunct distribution from the latter. It is transferred here to *C. hisauchiana* without any change in rank. *Chionographis japonica* var. *kurohimensis* differs from *C. hisauchiana* subsp. *hisauchiana* and *C. hisauchiana* subsp. *minoensis* in chromosome number and some morphological characters (Tanaka, 1985, and key below) and has a disjunct distribution from the latter subspecies. It is therefore treated here as a third subspecies of *C. hisauchiana*.

Chionographis hisauchiana as here circumscribed (Figs. 1B, 2B–2D) is distributed in more northern regions in Japan (central and northern Honshû) than *C. japonica* (Figs. 1A, 2A; Kyûshû, Shikoku and west to central Honshû) with a very minor overlap in their ranges.

A more detailed account of the variation and taxonomy of the genus *Chionographis* will be forthcoming.

Chionographis hisauchiana (Okuyama) N. Tanaka, comb. et stat. nov. Basionym: *Chionographis japonica* var. *hisauchiana* Okuyama, J. Jap. Bot. 27: 268. 1952. *Chionographis japonica* subsp. *hisauchiana* (Okuyama) H. Hara, J. Jap. Bot. 43: 263. 1968. TYPE: Japan. Honshû: Prov. Musashi [Tôkyô-to], Kasumimura, 3 June 1951, *T. Satow 7594* (holotype, TNS). Figures 1B, 2B.

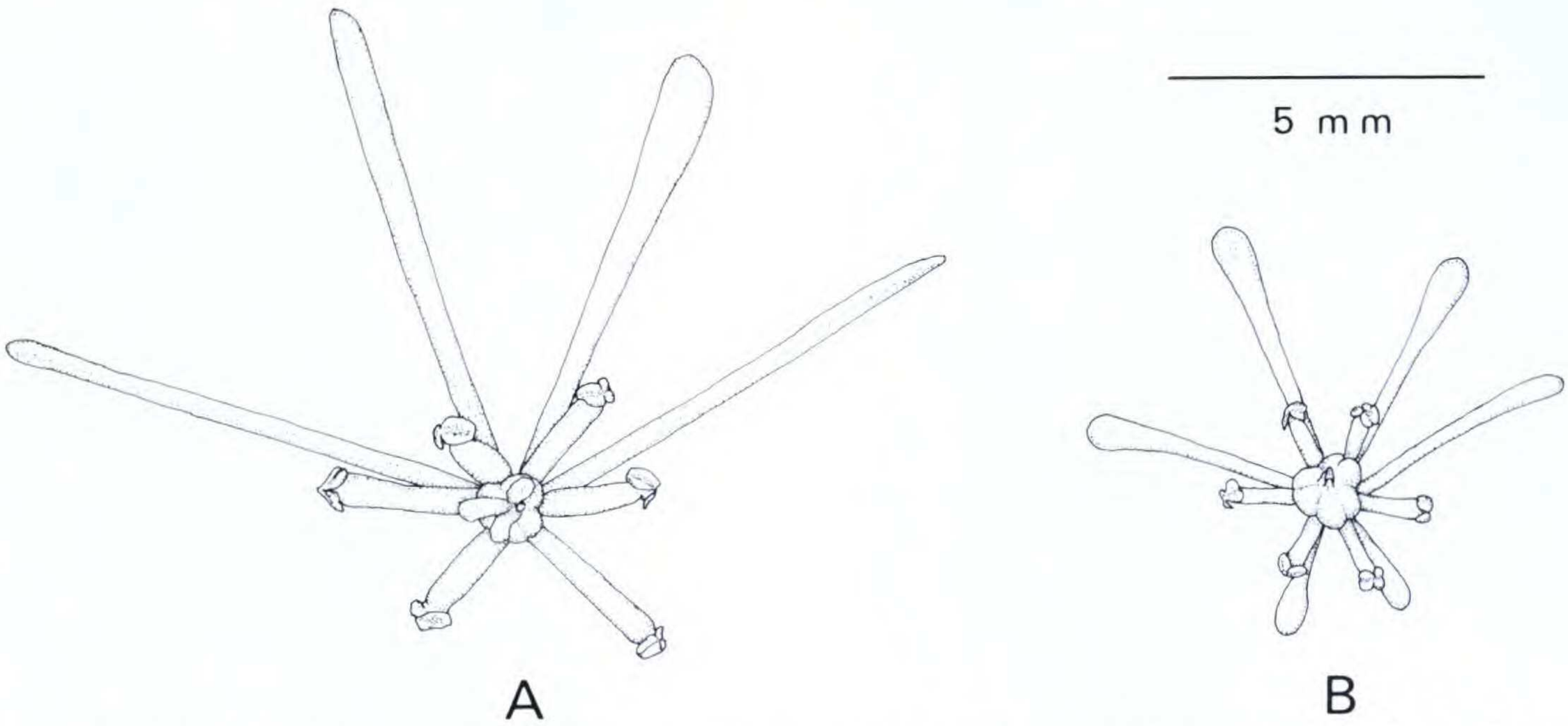

Figure 1. Flowers of *Chionographis* from Japan. —A. *C. japonica* (Willdenow) Maximowicz from Ôsaka, Kôchi Pref., Shikoku (*N. Tanaka 1* (TEU)). —B. *C. hisauchiana* (Okuyama) N. Tanaka subsp. *hisauchiana* from Naguri-mura, Saitama Pref., Honshû (*N. Tanaka 1a* (TEU)). Both flowers bisexual and at same scale. Drawn from living plants.

Selected additional specimens. JAPAN. **Honshû:** Saitama Pref., Iruma-gun, Naguri-mura, 19 Oct. 1990, *N. Tanaka M32B* (TEU), 4 June 1990, *N. Tanaka 1a* (TEU); Saitama Pref., Iruma-gun, Mt. Ogami, 25 May 1952, *M. Mizushima s.n.* (TI); Tôkyô-to, Ôme-shi, Osogi-mura, 23 Oct. 1949, *T. Satow 7495* (TI).

Chionographis hisauchiana subsp. **minoensis** (H. Hara) N. Tanaka, comb. nov. Basionym: *Chionographis japonica* var. *minoensis* H. Hara, J. Jap. Bot. 36: 239. 1961. *Chionographis japonica* subsp. *minoensis* (H. Hara) H. Hara, J. Jap. Bot. 43: 263. 1968. TYPE: Japan. Honshû: Prov. Mino [Pref. Gifu], Yokokura-mura, N of Kanbara, alt. ca. 300 m, 5 June 1961, *H. Hara & S. Kurosawa s.n.* (holotype, TI). Figure 2C.

Selected additional specimens. JAPAN. **Honshû:** Gifu Pref., Motosu-gun, Neo-mura, 26 Mar. 1987, *N. Tanaka 3* (TEU); Gifu Pref., Gujô-gun, Gujô-hachiman, Nabi, 17 Sep. 1967, *K. Inami s.n.* (TNS-184890); Gifu Pref., Mino, Natsuzaka, 29 May 1968, *H. Hara & S. Kurosawa s.n.* (TI).

Chionographis hisauchiana subsp. **kurohimensis** (Ajima & Satomi) N. Tanaka, comb. et stat. nov. Basionym: *Chionographis japonica* var. *kurohimensis* Ajima & Satomi, J. Geobot. 24: 48. 1976. TYPE: Japan. Honshû: Pref. Niigata, Mt. Kurohime, 21 June 1975, *T. Ajima 4546* (holotype, KANA-83861). Figure 2D.

Selected additional specimens. JAPAN. **Honshû:** Niigata Pref., Santô-gun, Koshiji-chô, Hakama, 13 May 1980, *N. Tanaka 7* (TEU); Niigata Pref., Murakami-shi, Kashio, 2 June 1963, *Y. Ikegami 56443* (TNS-162516); Niigata Pref., Kariwa-gun, Mt. Hachikoku, 30 May 1952, *S. Iwano s.n.* (KANA-13338).

Selected specimens of Chionographis japonica. JAPAN. **Kyûshû:** Nagasaki Pref., Mt. Unzen, June 1934, *T. Makino s.n.* (MAK-137210); Kagoshima Pref., Koshiki Isl., Shimo-koshiki-mura, Nagahama, 31 July 1961, *A. Nitta s.n.* (KYO). **Shikoku:** Kôchi Pref., Ôsaka, 4 June 1984, *N. Tanaka 1* (TEU); Kôchi Pref., Sakawa, 26 May 1889, *T. Makino s.n.* (MAK-137200). **Honshû:** Hiroshima Pref., Taishakukyô, 1 June 1984, *N. Tanaka 1* (TEU); Gifu Pref., Motosu-gun, Neo-mura, 25 May 1910, *M. Matsui s.n.* (MAK-137171).

KEY TO FOUR TAXA OF *CHIONOGRAPHIS* OCCURRING IN JAPAN

1a. Flowers with lower 2 tepals vestigial, with 1 or both often absent (Fig. 1A); main veins of leaf blades obscurely impressed and fine veins tending to be slightly elevated adaxially (Fig. 2A); leaf blades usually opaque adaxially; plants usually hermaphrodite but self-incompatible; $2n = 24$ . . . . . *C. japonica*

1b. Flowers with lower 2 tepals shorter than upper ones but always present (Fig. 1B); main veins of leaf blades clearly impressed and fine veins not elevated adaxially; leaf blades lustrous or nearly opaque adaxially (Fig. 2B–2D); populations usually gynodioecious, sometimes hermaphrodite where hermaphroditic individuals self-compatible; $2n = 42$ or 44.

2a. Leaf blades nearly opaque adaxially (Fig. 2B), comparatively thin; upper tepals 2.7–5.7 mm long (Fig. 1B); $2n = 42$ . . . . . *C. hisauchiana* subsp. *hisauchiana*

2b. Leaf blades lustrous adaxially (Fig. 2C, 2D), comparatively thick; upper tepals 3.6–12.0 mm long.

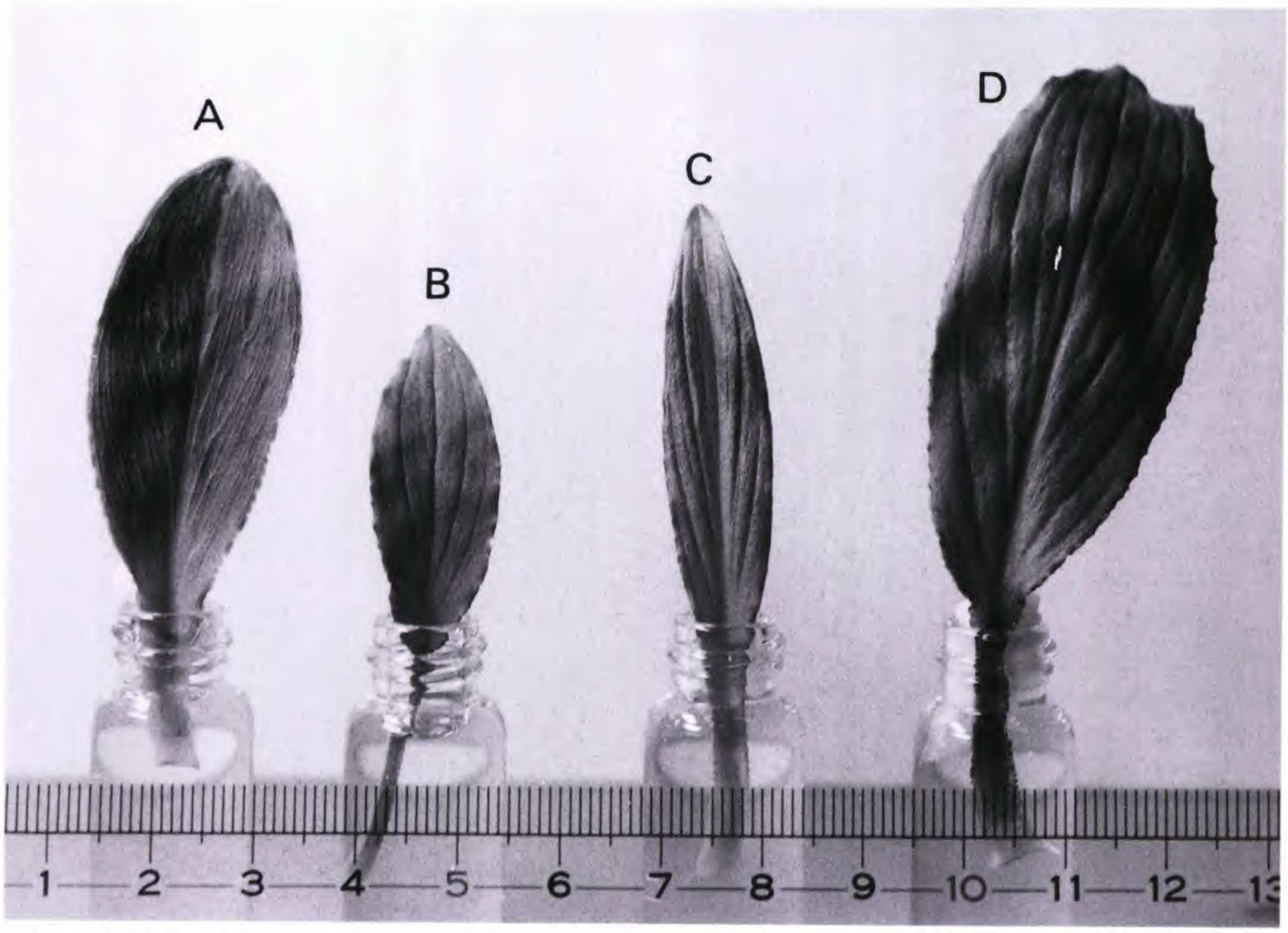

Figure 2. Leaves of four taxa of *Chionographis* from Honshû, Japan. —A. *C. japonica* (Willdenow) Maximowicz from Taishakukyô, Hiroshima Pref. (*N. Tanaka 1* (TEU)). —B. *C. hisauchiana* (Okuyama) N. Tanaka subsp. *hisauchiana* from Naguri-mura, Saitama Pref. (*N. Tanaka M32B* (TEU)). —C. *C. hisauchiana* subsp. *minoensis* (H. Hara) N. Tanaka from Neo-mura, Gifu Pref. (*N. Tanaka 3* (TEU)). —D. *C. hisauchiana* subsp. *kurohimensis* (Ajima & Satomi) N. Tanaka from Hakama, Niigata Pref. (*N. Tanaka 7* (TEU)). All from living plants in cultivation.

3a. Leaf blades usually narrowly elliptic or narrowly oblong (Fig. 2C); main veins usually deeply impressed adaxially; upper tepals 3.6–6.9 mm long; $2n = 42$ . . . . . *C. hisauchiana* subsp. *minoenisis*

3b. Leaf blades usually elliptic to oblong (Fig. 2D); main veins moderately impressed adaxially; upper tepals 3.7–12.0 mm long; $2n = 44$ . . . . . *C. hisauchiana* subsp. *kurohimensis*

In the above key the ranges of variation in tepal length of the three subspecies of *C. hisauchiana* are based on the following samples: subspecies *hisauchiana*, 33 individuals from 1 locality; subspecies *minoenisis*, 35 from 1; subspecies *kurohimensis*, 446 from 13. The ranges include measurements of both female and hermaphrodite plants.

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